
Space Weather Forecast

Issued on Sunday, 22 September 2024 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Moderate flares (R1/R2 Radio Blackouts) throughout. Chance of Active to G1/Minor Geomagnetic Storm intervals 24-25 Sep.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only occasional Common class flares observed, the largest from a region just west of the north-centre disc. There are currently eight sunspot regions on the Earth-facing disc. The largest region remains a slightly complex region in the southeast disc. One region in the northwest, has recently lost its delta spot, which has separated away from the large leader spot. Another region, in close proximity, is one of the most magnetically complex on the disc and has recently seen the consolidation of the central portion into a developing weak delta spot. Another region, in the southwest, which was the source of the notable Strong flare on 14 Sep, generally continues to decay. The other regions are smaller, simpler and stable.

No Earth-directed CMEs (coronal mass ejections) were observed.

Solar Wind / Geomagnetic Activity: Solar wind speeds have ranged between background to slightly elevated levels, between 340km/s to 450km/s. Speeds are currently near 400km/s. The Interplanetary Magnetic Field was weak throughout, with the important north-south component fluctuating between being weakly northward and southward directed. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a chance of isolated Moderate-class flares. At least one new or returning region is expected to rotate onto the disc by Day 2 (23 Sep). This is supported by brightness close to the limb on SDO/AIA-0094 imagery and helioseismic analysis of the far-side.

Solar Wind / Geomagnetic Activity: No Earth-directed Coronal Mass Ejections (CMEs) currently feature in the forecast. Slight chance of a weak enhancement during Day 1 (22 Sep) from any interaction with the faster solar winds from a narrow coronal hole in the northwest. Further enhancement then expected from late on Day 3 (24 Sep) associated with another fast wind enhancement from a larger and more strongly defined coronal hole, currently near centre disc. The net results is for winds to largely remain at, or close to, background levels before increasing towards the end of the period to around 500 km/s.

Mainly Quiet activity forecast (Kp 0-2) with isolated Unsettled (Kp 3) intervals. Any onset of the fast winds towards the end of Day 3 and during Day 4 (25 Sep) will bring the chance of Active (Kp 4) intervals and a chance of G1/Minor Geomagnetic Storm intervals (Kp 5).

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background with no solar radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	20	40
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	40	40	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)